

## Remarks

**[0001]** Herein, the "Action" or "Office Action" refers to the Final Office Action date March 26, 2007.

**[0002]** Applicant respectfully requests reconsideration and allowance of all of the claims of the application. Claims 1-27 are presently pending. Claims amended herein are None. Claims withdrawn or cancelled herein are None. New claims added herein are None.

**[0003]** Applicant's amendments and remarks after Final are appropriate under 37 C.F.R. §1.116 because they address the Office's remarks in the Final Action, and thus could not have been presented earlier. In addition, the amendments and remarks should be entered to place the case in better form for appeal.

### **Statement of Substance of Interview**

**[0004]** The Examiner graciously talked with me—the undersigned representative for the Applicant—on June 18, 2007. Applicant greatly appreciates the Examiner's willingness to talk. Such willingness is invaluable to both of us in our common goal of an expedited prosecution of this patent application.

**[0005]** In that discussion, I explained what I viewed as the differences between the cited art (i.e., *Pabla* and *Xie*) and the claims, and discussed a possible claim amendment which would further clarify one of the differences. The Examiner indicated that he would like to see my

written response to the last Office Action, and indicated that an additional search may need to be performed. Applicant appreciates the Examiner's help in expediting the prosecution of this application.

## **Substantive Claim Rejections**

### **35 USC § 103 Claim Rejections**

**[0006]** Claims 1-27 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Application No. 2004/0064693 to Pabla et al. (*hereinafter*, "Pabla") in view of a publication entitled "P2P Systems Based on Distributed Hash Table" by Ming Xie dated September 26, 2003 (*hereinafter*, "Xie") (*Office Action*, p.2).

**[0007]** Applicant respectfully traverses each of the §103 rejections, and requests reconsideration and allowance in light of the comments contained herein. Accordingly, Applicant requests that the rejections be withdrawn and that the case be passed along to issuance.

**[0008]**     **Claim 1** recites a method for building a data overlay, comprising:

providing a distributed hash table (DHT) that governs the insertion and retrieval of objects into and from a peer-to-peer system, wherein the distributed hash table includes a logical space including a plurality of DHT nodes having an associated plurality of DHT zones; and

building the data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure, wherein the data structure facilitates dissemination of information to the DHT nodes and gathering of information from the DHT nodes.

**[0009]**     Pabla and/or Xie do not teach or suggest the combination of features recited in claim 1. For example, the Pabla-Xie combination does not teach or suggest, "building the data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure, wherein the data structure facilitates dissemination of information to the DHT nodes and gathering of information from the DHT nodes", as recited in claim 1.

**[0010]**     In the Action, the Office indicates that Pabla describes "building the data overlay as a data structure on top of the logical space" (*Office Action*, p.3; *Pabla*, [0572] and [0642]). However, Pabla does not describe "building the data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data

structure with the DHT nodes, and by establishing links between the objects in the data structure”, as recited in claim 1. The Office admits that Pabla does not teach the building the recited data overlay “by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure”, as recited in claim 1.

**[0011]** The Office then cites to Xie as curing the deficiencies of Pabla (*Office Action*, p.4; Xie, pp.3-4 §§ 4.1 and 4.2). However, Xie fails to cure the deficiencies of Pabla as Xie does not describe building the data structure on top of the logical space of the distributed hash table “by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure”, as recited in claim 1.

**[0012]** Instead, Section 4 of Xie simply describes that many recent peer to peer (P2P) systems use a distributed hash table (DHT) to support scalability (*Xie*, p.3 §4). In other words, the cited section simply describes information that was also provided in the “Background Section” of the pending application (*Application*, Background Section pp.1-2). For example, the “Background” section describes that “P2P systems commonly use a distributed hash table (DHT) to facilitate storage and retrieval of objects from peer entities participating in the system (*Application*, Background Section p.1 ln.18-19). More specifically, sections §§ 4.1 and 4.2 of Xie which were cited by the Office, simply define terms related to P2P systems and DHTs, and generally describe how DHT functionality

allows nodes to put and get files in the P2P system based on their keys (*Xie*, p.4 §§ 4.1 and 4.2).

**[0013]** Xie does not cure the deficiencies of Pabla, as Xie does not describe “building the data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure”, as recited in claim 1 (Emphasis Added).

**[0014]** When citing to Xie, the Offices states that Xie describes that “files are associated with keys and a node in the P2P system handles a portion of hash space is responsible for storing a range of keys serving as basis for object retrieval and storage” (*Office Action*, p.4). However, Xie say nothing about “building the data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure”, as recited in claim 1.

**[0015]** Applicant also notes that the final section of Xie which is entitled “Summary and Future Work” also fails to cure the deficiencies of Pabla (*Xie*, pp.5-6 §5). This final section of Xie states that “[t]he current researches are focusing on using different topologies, such as torus, ring, de bruijn, butterfly and so on, to achieve better routing performance...” and that “[t]he future work will overlay different topologies to achieve efficient routing...such as the overly network of de bruijn and Chord ring, k Chord rings, k de bruijns etc.” (*Xie*, pp.5-6 §5). Although this section uses

the term "overlay" it is not describing "building the data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure", as recited in claim 1. Instead, this section uses the term "overlay" when describing the combining two different DHT routing strategy configurations/topologies with each other to form a combined DHT routing strategy. For example, a CAN strategy (having a "d-Torus" topology) for managing the storage and retrieval of objects in a P2P system might be combined with a CHORD strategy (having a "Ring" topology) for managing the storage and retrieval of objects in a P2P system to create a new DHT routing strategy which has a new topology that is a combination or of the "d-Torus" and the "Ring" topologies.

**[0016]** Stated simply, the final section of Xie which is entitled "Summary and Future Work" also fails to cure the deficiencies of Pabla, as it does not describe "building the data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure", as recited in claim 1 (Emphasis Added).

**[0017]** As such, the Pabla-Xie combination fails to teach or suggest all of the features recited in claim 1. Accordingly, claim 1 is allowable over the Pabla-Xie combination for at least the reasons described above, and Applicant requests that the §103 rejection of claim 1 be withdrawn.

**[0018]** Accordingly, claim 1 is allowable over the Pabla-Xie combination for at least these reasons, and Applicant respectfully requests that the §103 rejection be withdrawn.

**[0019]** **Claims 2-14** are allowable over the Pabla-Xie combination by virtue of their dependency upon allowable claim 1. Additionally, one or more of claims 2-14 are allowable for independent reasons. For example:

**[0020]** Claim 4 recites "wherein the data overlay has a topology of a tree, the tree having a plurality of tree nodes associated with respective DHT nodes, wherein each tree node has a respective tree node zone associated therewith which corresponds to a part of the logical space of the distributed hash table."

**[0021]** When rejecting claim 4, the Office argues that the "tree structure is established when distribution index is a distributed hash table", and then cites to both Pabla and Xie as disclosing the recited tree topology (*Office Action*, p.10; Pabla [0085], [0091]-[0092], [0456] and [0685], and Xie p.6 lns.1-3).

**[0022]** The cited sections of Pabla generally describe peer-to-peer networks, and indicate that a notification system may be implemented using the distributed index to notify peers of other peer joining a peer to peer session (*Pabla*, [0085], [0091]-[0092], [0456] and [0685]). The cited sections of Xie generally describe combining two different DHT routing strategy configurations/topologies with each other to form a combined DHT routing strategy. However, the cited sections of Pabla and/or Xie do

not describe "wherein the data overlay has a topology of a tree, the tree having a plurality of tree nodes associated with respective DHT nodes, wherein each tree node has a respective tree node zone associated therewith which corresponds to a part of the logical space of the distributed hash table", as recited in claim 4.

**[0023]** Claim 10 recites the method according to claim 4 wherein the building of the data overlay comprises:

examining a tree node zone associated with a particular tree node to determine whether the tree node zone is smaller than or equal to a DHT zone associated with the particular tree node's hosting DHT node; and

adding a child node associated with the particular tree node if the examining determines that the tree node zone is not smaller than or equal to the associated DHT zone.

**[0024]** When rejecting claim 10, the Office argues that Pable discloses these additional limitation, and then cites to paragraphs [0012] and [0062] of Pable (*Office Action*, p.12; Pable [0012] and [0062]). The cited sections of Pable generally describes that each node in a distributed hash table stores a range of keys, and that objects are added to or retrieved from a particular DHT node depending on whether their keys fall within the range of keys associated with that particular DHT node (*Pable*, [0012] and [0062]). The cited sections are directed to a distributed has table, and are not directed to a data overlay which is built over the DHT. More specifically, the cited sections do not describe that the building of the data overlay comprises: "examining a tree node zone



associated with a particular tree node to determine whether the tree node zone is smaller than or equal to a DHT zone associated with the particular tree node's hosting DHT node; and adding a child node associated with the particular tree node if the examining determines that the tree node zone is not smaller than or equal to the associated DHT zone", as recited in claim 10.

**[0025]**     **Claim 15** recites a computer readable store having stored thereon a data structure, comprising:

        a logical space of a distributed hash table (DHT), including a plurality of DHT nodes having a plurality of associated DHT zones, wherein the distributed hash table governs the insertion and retrieval of objects into and from a peer-to-peer system;

        a data overlay implemented as a data structure on top of the logical space of the distributed hash table logical space, wherein the data overlay uses services provided by the distributed hash table in routing from one object to another in the data structure, and wherein the data structure facilitates dissemination of information to the DHT nodes and gathering of information from the DHT nodes.

**[0026]**     Claim 15 is rejected for reasons similar forth in the rejection of claim 1 (*Office Action*, p. 6). In response, Applicant asserts that claim 15 allowable over the Pabla-Xie combination based on reasoning similar to that discussed above in response to the rejection of claim 1. For the sake of brevity, Applicant has not repeated the arguments.

**[0027]** Accordingly, claim 15 is allowable over the Pabla-Xie combination for at least these reasons, and Applicant respectfully requests that the §103 rejection be withdrawn.

**[0028]** **Claim 16** is allowable over the Pabla-Xie combination by virtue of its dependency upon allowable claim 15. Additionally, claim 16 may also be allowable for independent reasons.

**[0029]** **Claim 17** recites a method for passing data through a data overlay, comprising:

providing a distributed hash table (DHT) that governs the insertion and retrieval of objects into and from a peer-to-peer system, wherein the distributed hash table includes a logical space including a plurality of DHT nodes having a plurality of associated DHT zones;

building a data overlay as a data structure on top of the logical space of the distributed hash table by associating objects in the data structure with the DHT nodes, and by establishing links between the objects in the data structure, wherein the data overlay defines a plurality of interconnected nodes, and wherein the data structure facilitates dissemination of information to the DHT nodes and gathering of information from the DHT nodes; and

routing data through the data overlay by passing the data through its interconnected nodes.

**[0030]** Claim 17 is rejected for reasons similar forth in the rejection of claim 1 (*Office Action*, p. 6). In response, Applicant asserts that claim 17 allowable over the Pabla-Xie combination based on reasoning similar to

that discussed above in response to the rejection of claim 1. For the sake of brevity, Applicant has not repeated the arguments.

**[0031]** Accordingly, claim 17 is allowable over the Pabla-Xie combination for at least these reasons, and Applicant respectfully requests that the §103 rejection be withdrawn.

**[0032]** **Claims 18-22** are allowable over the Pabla-Xie combination by virtue of their dependency upon allowable claim 17. Additionally, one or more of these claims may also be allowable for independent reasons.

**[0033]** **Claim 23** recites a peer-to-peer system including a plurality of machines interacting in peer-to-peer fashion, comprising:

a logical space of a distributed hash table (DHT), including a plurality of DHT nodes having a plurality of associated DHT zones, wherein the distributed hash table governs the insertion and retrieval of objects into and from the peer-to-peer system; and

a data overlay implemented as a data structure on top of the logical space of the distributed hash table, wherein the data overlay uses services provided by the distributed hash table in routing from one object to another in the data structure,

wherein the logical space of the distributed hash table and the data overlay are implemented in distributed fashion in respective stores of the plurality of machines in the peer-to-peer system.

**[0034]** Claim 23 is rejected for reasons similar forth in the rejection of claim 1 (*Office Action*, p. 6). In response, Applicant asserts that claim 23 allowable over the Pabla-Xie combination based on reasoning similar to that discussed above in response to the rejection of claim 1. For the sake of brevity, Applicant has not repeated the arguments.

**[0035]** Accordingly, claim 23 is allowable over the Pabla-Xie combination for at least these reasons, and Applicant respectfully requests that the §103 rejection be withdrawn.

**[0036]** **Claims 24-27** are allowable over the Pabla-Xie combination by virtue of their dependency upon allowable claim 23. Additionally, one or more of these claims may also be allowable for independent reasons.

### **Dependent Claims**

**[0037]** In addition to its own merits, each dependent claim is allowable for the same reasons that its base claim is allowable. Applicant submits that the Office withdraw the rejection of each dependent claim where its base claim is allowable.

## **Conclusion**

**[0038]** All pending claims are in condition for allowance. Applicant respectfully requests reconsideration and prompt issuance of the application. If any issues remain that prevent issuance of this application, the Office is urged to contact the undersigned attorney before issuing a subsequent Action.

Respectfully Submitted,

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